A NEW SPECIES OF THE GENUS *CATACANTHUS* SPINOLA (HETEROPTERA: PENTATOMIDAE: PENTATOMINAE) FROM THE NEW HEBRIDES WITH MORPHOLOGICAL NOTES ON TWO OTHER AUSTRALASIAN SPECIES AND THEIR RELATIONSHIPS[1]

by

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ABSTRACT

AHMAD, I., and KAMALUDDIN, S. 1981. A new species of the genus *Catacanthus* Spinola (Heteroptera: Pentatomidae: Pentatominae) from the New Hebrides with morphological notes on two other Australasian species and their relationships. *Rec. S. Aust. Mus.* **18** (11): 227-233.

Catacanthus grossi Ahmad & Kamaluddin, n.sp. of the tribe Catacanthini Stål from the New Hebrides is described and its metathoracic scent gland ostioles and genitalia examined and figured. Morphological notes on two other Australasian species, *C. carrenoi* (Le Guillou) and *C. punctus* (Fabr.), are given and the three species above are compared with *C. incarnatus* (Drury) from the Oriental region and the relationships of the four species are briefly discussed.

INTRODUCTION

Gross (1976) placed the genus *Catacanthus* Spinola in his general section of Pentatominae allied to his *Menida, Piezodorus, Pentatoma* & *Rhynchocoris* groups for want of sufficient male specimens. Ahmad and Afzal (1978) studied the external morphology, including the metathoracic scent gland ostioles, and the male and female genitalia and also the internal anatomy including the digestive, male and female reproductive organs and the scent and salivary apparati of *C. incarnatus* (Drury) and proposed the resurrection of Catacanthini Stål within the subfamily Pentatominae Amyot et Serville.

Recently by the courtesy of Dr G. F. Gross, Principal Curator of South Australian Museum, the authors were given the opportunity to examine a unique male specimen of *Catacanthus* from the New Hebrides which differs from all other species in being a uniformly dark purplish-brown with the venter and all femora yellow in contrast to the generally patterned body of brilliant, shining colours in other species. It is described here as *C. grossi* n.sp., and the structure of its metathoracic scent gland ostioles and genitalia have been investigated. Male and female specimens of two other species, *C. punctus* (Fabricius)—also by the courtesy of Dr Gross—and *C. carrenoi* (Le Guillou) by the courtesy of Dr W. J. Knight and Mr W. R. Dolling of the British Museum (Natural History), London, were examined with special reference to the above characters, for there has been a general belief that the two species may be synonymous (Gross, personal communication). Diagrams of the male and female genitalia of *C. incarnatus* (Drury) are also given for comparison and for further clarification of the structures and the relationships of the included taxa are briefly discussed in this light. For dissections, drawings and measurements the conventional procedures, especially those used by the present authors (1976), were generally followed.

Catacanthus carrenoi (Le Guill.)

(Figs. 1-4, 12-15, 29, 31)

Raphigaster carrenoi Le Guillou, 1841, p. 262.

Pentatoma tricolor Montrouzier, 1855, p. 96.

Catacanthus carrenoi, Stål, 1876, p. 89.

Coloration: Body pale, reddish except head (excluding brownish-black eyes), pinkish ocelli, pronotum with anterior and anteriolateal margins including callosities and a wide posteriomedial portion, scutellum with basal wide portion, each corium with a large transverse spot on middle portion, clavus, legs, antennae and labium black, connexiva reddish, membrane of hemelytra light brown.

Head: Slightly broader than long; anteocular region slightly shorter than posterior portion of head including eyes; antennae with 3rd segments longer than 2nd and equal to 2¼ x basal, length of segments, 1 1.2 mm (1.2-1.5 mm), 2 3.0 mm (3.0-3.2 mm), 3 3.3 mm (3.1-3.3 mm), 4 4.5 mm, 5 4.1 mm, antennal formula 1<2<3<4; labium passing mesocoxae, basal segments shorter than bucculae, 3rd segment longest and distinctly more than 1½ x basal, length of segments 1 1.3 mm (1.3-1.5 mm), 2 2.0 mm (1.9-2.2 mm), 3 2.35 mm (2.0-2.4 mm), 4 1.75 mm (1.5-1.8 mm), labial formula 1<4<2<3; length anteocular region 1.5 mm (1.5-1.6 mm); length posterior of head including eyes

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1.6 mm (1.6-1.75 mm), width 3.15 mm (3.15-3.9 mm); interocellar distance 1.7 mm (1.7-1.8 mm); interocellar distance 1.0 mm (0.9-1.1 mm).

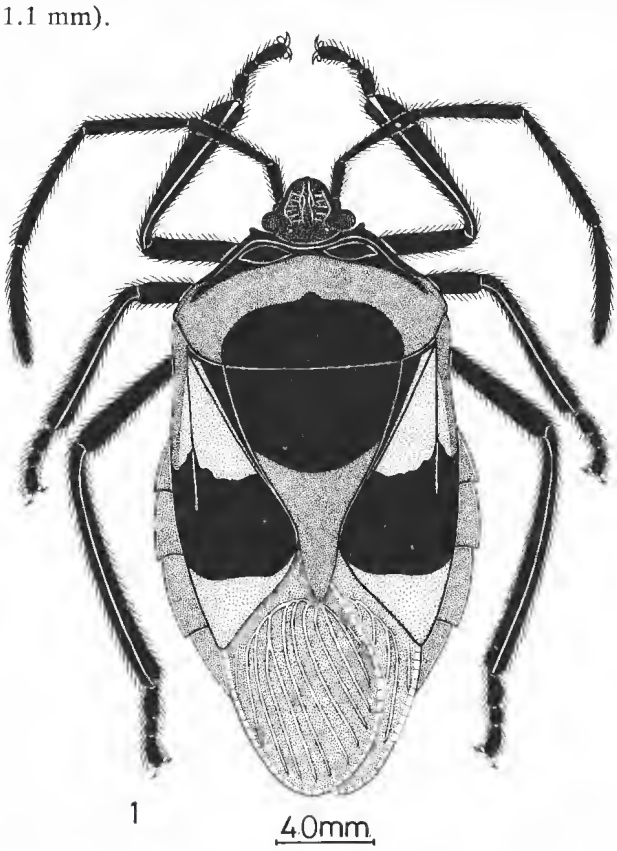


FIG. 1. *Catacanthus carrenoi* Le Guillou in dorsal view.

Thorax and Abdomen: Pronotum with humeral angles rounded, length of pronotum 4.4 mm (3.8-5.2 mm), width 10.4 mm (9.4-12.0 mm); scutellum with apical lobe narrowed, apex acute, length of scutellum 8.5 mm (8.2-10.0 mm), width 6.5 mm (6.0-7.4 mm); mesosternum slightly raised and rugulose; metathoracic scent gland ostioles (Fig. 2) small, somewhat ovate, peritremes elongated tapering anteriolateral, apically somewhat acute, evaporating area distinct; distance base scutellum-apex clavus 6.6 mm (6.2-7.6 mm); apex clavus-apex corium 4.3 mm (3.5-4.8 mm); apex corium-apex membrane 5.8 mm (5.2-6.1 mm); apex scutellum-apex membrane including abdomen 8.1 mm (7.2-9.0 mm); abdomen with basal abdominal spine only reaching hind coxae; connexiva distinctly exposed in repose; in ♀ posterior margin of 7th abdominal sternum medially shallowly folded in, laterally almost straight. Total length ♂ 24.1 mm (22.3-24.1 mm), ♀ 27.55 mm.

Male genitalia: Pygophore (Figs. 3 and 4) with dorsomedian surface deeply concave, three spinelike processes at inner side of posterior lateral margins, ventroposterior margin folded in medially, laterally distinctly sinuated, ventrolateral lobe with two spinelike fused processes, directed inward; parameres (Fig. 12) F-shaped, inner process short, outer and inner margins entire, sinuated, apex much narrowed, acute; theca (Figs. 13-15) with an unpaired dorsal blunt thumb-like large median thecal appendage, a pair of dorsal thecal appendages with lateral, horn-like, semisclerotized lobes, a pair of ventral thecal appendages proximally semisclerotized and distally sclerotized and denticulated, and a bilobed dorsal membranous conjunctival appendages with distal portion sclerotized and outwardly sinuated, vesica short, penial lobes ovate medially and outwardly fused with conjunctiva.

Female genitalia: (Fig. 29) 8th paratergites fused, medially almost straight, sub-equal to 1st gonocoxae, latter with posterior margin sinuated, 9th paratergites lobelike, elongated, outer margin medially concave, slightly passing beyond posterior margins of fused 8th paratergites, proctiger posteriorly substraight, 2nd gonocoxae broad; spermatheca (Fig. 31) with pump region medially faintly constricted, bulb with two equal elongated, fingerlike processes.

Material examined: 2 ♂, 1 ♀, N. Borneo, Philippines and New Guinea: 1911; June 1936 leg Distant, W. L. Cheesman, L. E., in British Museum (Natural History).

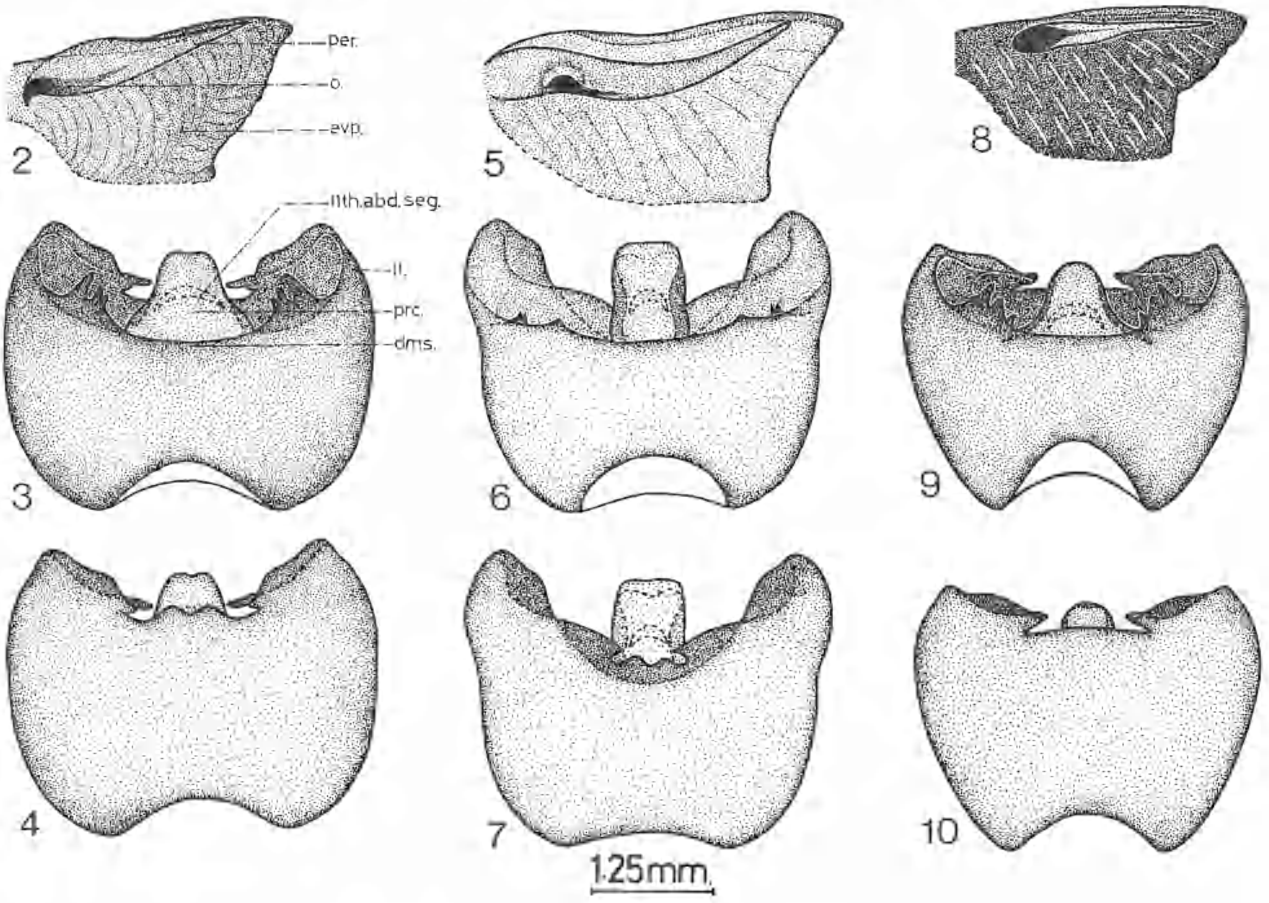
Comparative Note: This species is most closely related to *punctus* (Fabr.) in general appearance but it can easily be separated in having the distal portion of the anterior tibiae dilated, the distal scutellar black patch distally rounded, the ostiolar peritreme much narrower and other characters as noted in the morphological description.

Catacanthus grossi n.sp.

(Figs. 5-7, 11, 16-19)

Coloration: Body coffee-coloured tinged with purple, green and black, except eyes brownish; punctate; ocelli reddish; legs excluding femora, antennae and labium black with greenish tinge, venter and connexiva pale except small portions at connexival joints black, membrane of hemelytra with distal half coffee coloured, proximal half transparent.

Head: Distinctly more than 25% broader than long; anteocular region distinctly shorter than posterior portion of head including eyes; antennae with 3rd segment distinctly longer than 2nd and slightly longer than 2x the basal, length of segments, 1 1.15 mm, 2 2.8 mm, 3 3.25 mm, 4-5 mutilated; labium reaching hind coxae with basal segments shorter than bucculae, 3rd segment distinctly more than 1½x basal, length of segments 1 1.4 mm, 2 1.9 mm, 3 2.3 mm, 4 1.7 mm, labial formula 1<4<2<3; length anteocular region 1.3 mm; length



FIGS. 2-10. 2-4—*Catacanthus carrenoi* Le Guillou, 2—metathoracic scent gland ostiole, evp. (evaporatoria), O. (ostiole), per. (peritreme); 3—pygophore in dorsal view, prc. (procuger), 11th abd. seg. (eleventh abdominal segment), dms. (dorsomedian surface), ll. (lateral lobe); 4—pygophore in ventral view. 5-7—*Catacanthus grossi* n. sp. 5—metathoracic scent gland ostiole, 6 pygophore in dorsal view, 7—pygophore in ventral view. 8-10—*Catacanthus punctus* (Fabr.). 8—metathoracic scent gland ostiole; 9—pygophore in dorsal view; 10—pygophore in ventral view.

posterior portion of head including eyes 1.6 mm; width 3.8 mm; interocular distance 1.7 mm; interocellar distance 0.8 mm.

Thorax and Abdomen: Pronotum with humeral angles subacute, length of pronotum 4.4 mm, width 10.7 mm; scutellum with apical lobe broad, apex subacute, length of scutellum 9.0 mm, width 6.8 mm; mesosternum slightly carinated and rugulose; metathoracic scent gland ostioles (Fig. 5) small, ovate, peritremes much elongated, medially curved, tapering anteriad, apically acute, evaporating area distinct; distance base scutellum-apex clavus 7.4 mm; apex clavus-apex corium 4.5 mm; apex corium-apex membrane 5.5 mm; apex scutellum-apex membrane including abdomen 8.8 mm; abdomen with basal abdominal spine only reaching mesocoxae; connexiva slightly exposed at repose; female not available. Total length ♂ 25.10 mm.

Male genitalia: Pygophore (Figs. 6 and 7) with dorsomedian surface shallowly concave, one bifurcated, short, spinelike process at inner sides of posterolateral margins, ventroposterior margin pushed in medially, latter raised into bilobed processes following laterally into beaklike structures; parameres (Fig. 16) L-shaped, blade with one short inner process and one dorsolateral out growth, outer margin sinuated, inner margin of anterior half of blade irregular; theca (Figs. 17-19) with an unpaired, dorsal, blunt, thumblike, small median thecal appendage, a pair of dorsal thecal appendages with lateral hornlike semisclerotized lobes, a pair of ventral thecal, proximally semisclerotized and distally sclerotized with larger teeth, a bilobed dorsal membranous conjunctival appendages, distally sclerotized and sinuated, vesica short, penial lobes platelike inner margin straight outer margin sinuated, medially and outwardly fused with conjunctiva.

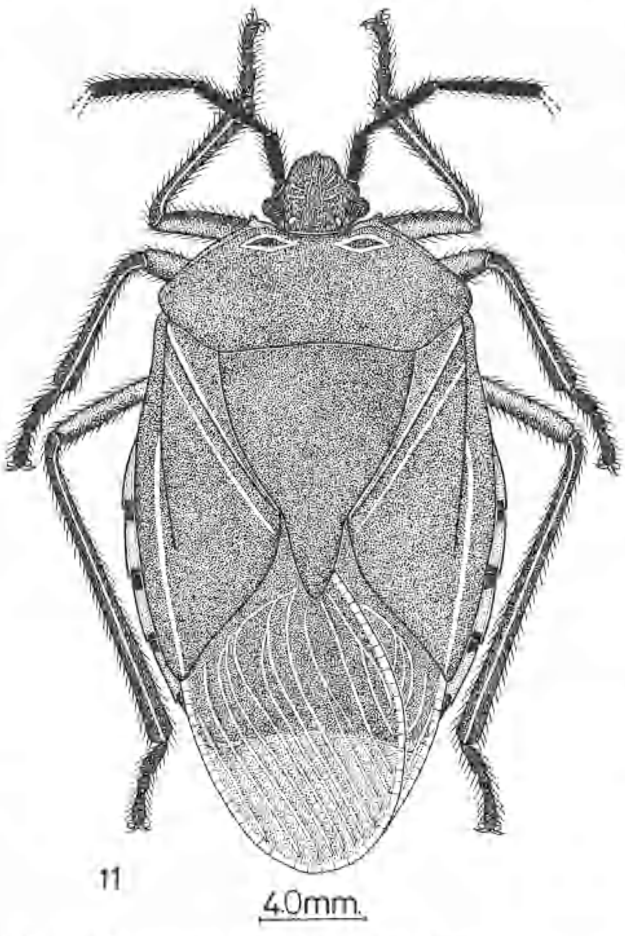


FIG. 11. *Catacanthus grossi* n.sp. in dorsal view.

Material examined: Holotype ♂, at light, vicinity of Anelgahaut, Aneityum I., New Hebrides, July 21, 1971 leg. G. F. Gross, Royal Society-Percy Sladen Trust Expedition (in the South Australian Museum).

Comparative Notes: This new species appears isolated in the entire genus and can be easily separated from the other species in having the chocolate body colour dorsally, elongated medially curved swordlike peritremes and the other characters as listed in the description.

Catacanthus punctus (Fabr.)

(Figs. 8-10, 24-28, 30, 32)

Cimex nigripes Sulzer, 1776, Pl. 10 f.9 (*nec* Fabricius)

C. punctum Fabricius, 1787, p. 291.

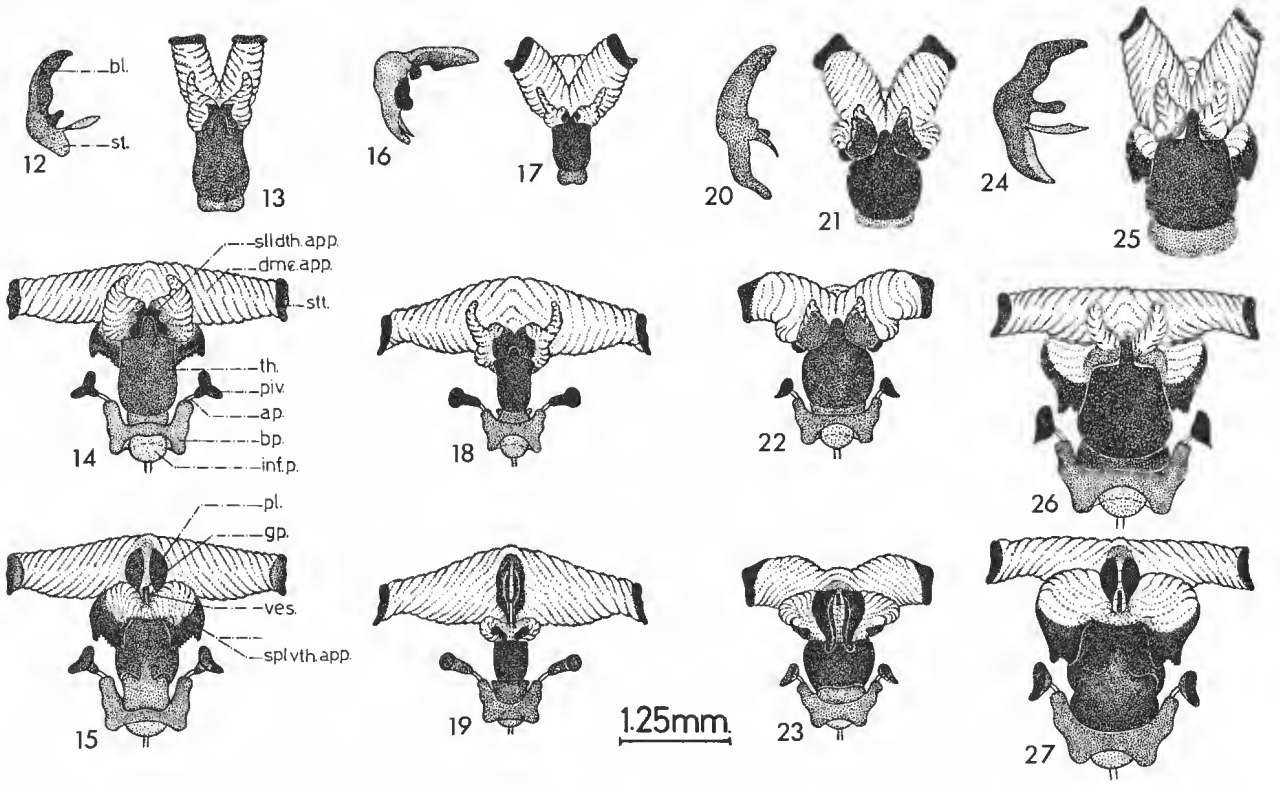
Edessa punctum Fabricius, 1803, p. 149.

Coloration: Body orange, tinged red except head (excluding brownish black eyes), ocelli reddish, pronotum with anterior and anteriolateral margins including callosities and a wide posteriomedial portion, scutellum with basal wide portions, each corium with a large transverse spot on posterior 2/3, clavus with basal portions, legs, antennae and labium black with greenish tinge, connexiva reddish, membrane of hemelytra light brown.

Head: Less than 1/2 again broader than long; anteocular region distinctly shorter than posterior portion of head including eyes; antennae with 3rd segments slightly longer than 2nd and distinctly more than 2¼x basal, length of segments 1 1.3 mm (1.3-1.4 mm), 2 3.0 mm (3.0-3.1 mm), 3 3.25 mm, 4 and 5 mutilated; labium and bucculae as in *carrenoi*, 3rd segment about 1½× basal, length of segments 1 1.5 mm (1.5-1.6 mm), 2 1.9 mm (1.9-2.2 mm), 3 2.2 mm (2.2-2.5 mm), 4 1.7 mm, labial formula 1<4<2<3; length anteocular region 1.4 mm (1.4-1.6 mm); length posterior portion of head including eyes 1.7 mm (1.7-1.8 mm); width 3.6 mm (3.6-3.9 mm); interocular distance 1.7 mm (1.7-1.9 mm); interocellar distance 1.0 mm (1.0-1.1 mm).

Thorax and Abdomen: Pronotum with humeral angles rounded length of Pronotum 4.6 mm (4.6-5.2 mm), width 11.0 mm (11.0-12.8 mm), scutellum with apical lobe narrowed, length of scutellum 9.1 mm (9.1-10.9 mm), width 6.8 mm (6.8-9.0 mm); mesosternum slightly sulcated and rugulose; metathoracic scent gland ostioles (Fig. 8) comparatively large, slitlike, peritremes elongated tapering lateral, apically sharp, acute, evaporative area distinct; distance base scutellum-apex clavus 6.9 mm (6.9-7.8 mm); apex clavus-apex corium 4.3 mm (4.3-5.2 mm); apex corium-apex membrane 6.0 mm (6.0-6.5 mm); apex scutellum-apex membrane including abdomen 8.0 mm (8.0-9.0 mm); abdomen with basal abdominal spine passing mesocoxae; connexiva distinctly exposed at repose; in ♀ posterior margin of 7th abdominal sternum medially deeply folded in, laterally concave. Total length ♂ 24.8 mm, ♀ 28.5 mm.

Male genitalia: Pygophore: (Figs. 9 and 10) with dorsomedian surface concave, three spinelike processes at inner side of posteriolateral margins, ventroposterior margin inpushed medially, latter slightly convex, ventrolateral lobe with two spinelike fused processes, directed inward; parameres (Fig. 24) F-shaped, stem with inner process large, outer and inner margins entire, sinuated, apex narrowed, subacute; theca (Figs. 25-27) with an unpaired, dorsal, blunt, thumblike, comparatively large median thecal appendage, a pair of dorsal thecal appendages with lateral comparatively small hornlike semisclerotized lobes, a pair of ventral thecal proximally semisclerotized and distally sclerotized and comparatively less denticulated and a bilobed dorsal membranous conjunctival appendages, distal portion sclerotized and concave; vesica short, penial lobes ovate medially and outwardly fused with conjunctiva.



FIGS. 12-19. 12-15—*Catacanthus carrenoi* Le Guillou, 12—paramere in inner view, bl. (blade), st. (stem); 12—uninflated theca in dorsal view; 14—inflated theca in dorsal view, ap. (apodeme), bp. (basal plate), dmc. app. (dorsal membranous conjunctival appendage), inf. p. (inflatory pump), slldth. app. (semisclerotized lateral lobe of dorsal thecal appendage), piv. (pivot), stt. (sclerotized tip), th. (theca); 15—inflated theca in ventral view, gp. (gonopore), pl. (penial lobe), splvth. app. (semisclerotized proximal lobe of ventral thecal appendage); 16-19—*Catacanthus grossi* n.sp., 16—paramere in inner view; 17—uninflated theca in dorsal view; 18—inflated theca in dorsal view; 19—inflated theca in ventral view.

FIGS. 20-27. 20-23—*Catacanthus incarnatus* (Drury), 20—paramere in inner view; 21—uninflated theca in dorsal view; 22—uninflated theca in dorsal view; 23—inflated theca in ventral view. 24-27—*Catacanthus punctus* (Fabr.); 24—paramere in inner view; 25—uninflated theca in dorsal view; 26—inflated theca in dorsal view; 27—inflated theca in ventral view.

Female genitalia: (Fig. 31) 8th paratergites fused, medially slightly concave, longer than 1st gonocoxae, latter with posterior margin convex, 9th paratergites lobelike, elongated outer margin sinuated, shorter than posterior margin of fused 8th paratergites, proctiger posteriorly concave, 2nd gonocoxae comparatively narrowed; spermatheca (Fig. 32) with pump region medially swollen, bulb with two unequal elongated fingerlike processes.

Material examined: 2♂, 1♀, Australian but unlocalised (in the South Australian Museum).

Comparative Note: This species is most closely related to *C. carrenoi* as noted above but it can readily be separated in having a smaller body size, the black patch on posterior of pronotum more elongated and a narrowed distal half of the peritremes beside other characters as noted under 'Relationships'.

RELATIONSHIPS OF THE INCLUDED TAXA

Distant (1902, p. 218), although treating *Catacanthus* in his division Nezaria, indicated that further studies might necessitate its separate treatment.

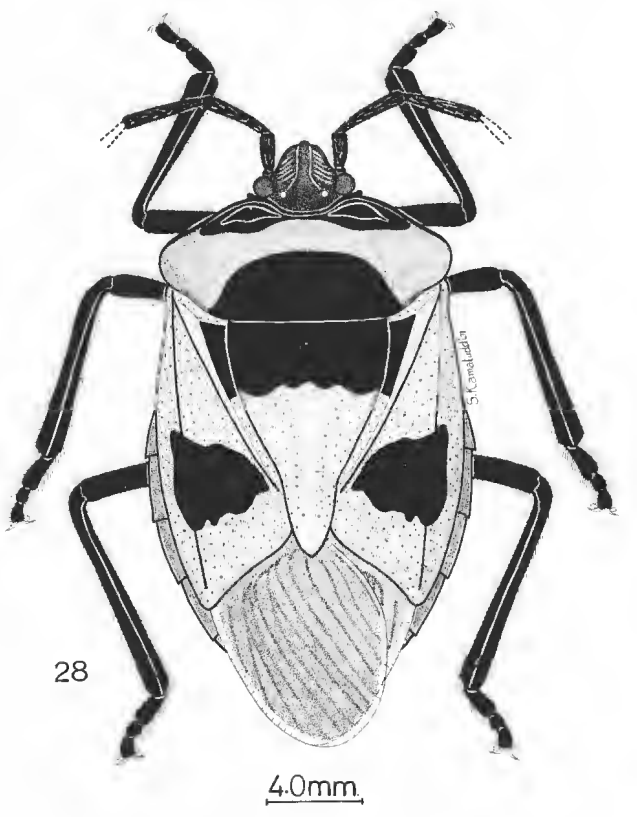
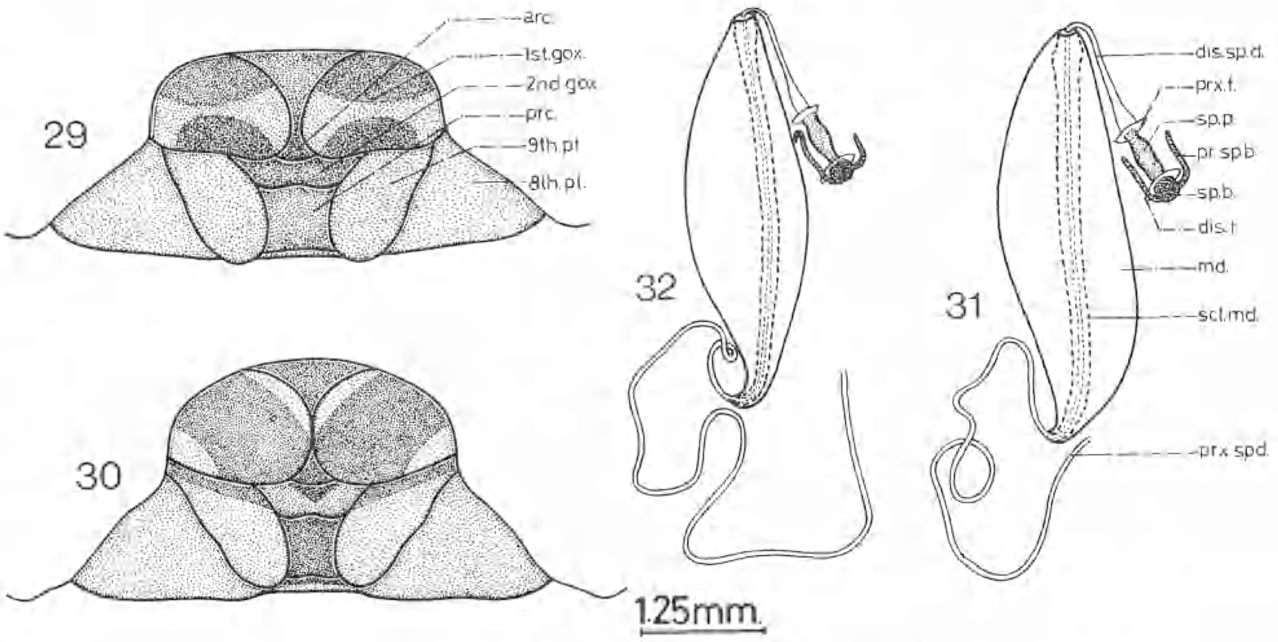


FIG. 28. *Catacanthus punctus* (Fabr.) in dorsal view.



FIGS. 29-32. 29—*Catacanthus carrenoi* Le Guillou—female terminalia in ventral view, 1st. gox. (first gonocoxa), 2nd gox. (second gonocoxa), 8th pt. (eighl paratergite), 9th pt. (ninth paratergite), arc. (arcus), prc. (proctiger); 30—*Catacanthus punctus* (Fabr.)—female terminalia in ventral view; 31—*Catacanthus carrenoi* Le Guillou—spermatheca, dis. f. (distal flange), dis.sp.d. (distal spermathecal duct), md. (median dilation), pr.sp.d. (process of spermathecal bulb), prox. f. (proximal flange), prox. sp.d. (proximal spermethecal duct), scl.md. (sclerotized median duct), sp.b. (spermathecal bulb), sp.p. (spermathecal pump); 32—*Catacanthus punctus* (Fabr.)—spermatheca.

Ahmad and Afzal (1978) in their external morphological and internal anatomical studies on *C. incarnatus* (Drury) have clearly demonstrated the distinctness of this genus within the subfamily Pentatominae Amyot et Serville and on that basis have resurrected the tribe Catacanthini Stål to accommodate the genus.

The present Australasian species *C. carrenoi*, *C. grossi* and *C. punctus* are clearly related to the type-species *C. incarnatus* from the Oriental region in their large size (24.8-28.5 mm), reflexed lateral margins of head and pronotum, more prominent clypeus than paraclypei, elongated daggershaped ostiolar peritreme, in male pygophore having dorsolateral inner processes, parameres with more or less prominent inner knobs at the base of the blade (not clearly shown by Ahmad and Afzal 1978), theca with a single dorsomedian, a pair of dorsal thecal appendages (with dorsolateral semisclerotized lobes) and a pair of ventral thecal appendages with ventrolateral semisclerotized lobes, a bilobed dorsal membranous conjunctival appendage with sclerotized tips and penial lobes fused medially and with conjunctiva and in the females with widely exposed arcus and second gonocoxae and spermatheca with a small spherical bulb having a pair of uniformly thin, elongated and curved fingerlike processes. The above characters also isolate *Catacanthus* in the entire subfamily Pentatominae and support Ahmad and Afzal's (1978) resurrection of Stål's tribe Catacanthini as separate from the Pentatomini.

However it shares with other pentatomines the characters of rounded unprojected humeral lobes, moderately narrowed head with sinuated lateral margins, scutellum with a distinct apical lobe, ostiolar peritreme highly developed and base of abdomen always with a spinous projection. Some of the characters of male and female genitalia including the inflated aedeagus with thecal appendages and spherical spermathecal bulb usually bearing fingerlike processes also show the two groups to be closely allied.

C. punctus and *C. carrenoi* appear more closely related to the type species *C. incarnatus* in having a brilliantly coloured and patterned body, a more or less straight ostiolar peritreme, in males the pygophore has the dorsolateral inner processes more or less trilobed, (second and third lobes ill developed in *C. incarnatus*), parameres somewhat F-shaped with a conical inner knob at the base of distally tapering blade, and in other characters as listed under the comparative and morphological notes of *C. carrenoi* and *C. punctus*.

C. carrenoi and *C. punctus* however, appear more closely related to each other in having a shining

black posteriomedian patch on pronotum and a poximal patch on scutellum (Figs. 1 and 28), in male more prominent inner knob of parameres and more or less spinulose comparatively large ventral thecal appendages in the inflated aedeagus (Figs. 15 and 27) and broadly rounded apices of 9th paratergites, in the females (Figs. 29 and 30) in contrast to no patch on pronotum and two shining black lateral patches on proximal portion of scutellum, in males less prominent and very short inner knob of parameres, and smooth comparatively smaller ventral thecal appendages in the inflated aedeagus (Fig. 4, labelled dorsal by Ahmad and Afzal, 1978) and narrowed tapering apices of 9th paratergites in females (Fig. 13, Ahmad and Afzal, 1978) in *C. incarnatus*. The two species have been suggested to be possibly synonymous (Gross, personal communication). However the comparatively much larger spinules on the ventral thecal appendages and the more or less equal processes of spermathecal bulb in *C. carrenoi* together with the other characters listed under the morphological and comparative notes clearly separate it from *C. punctus*.

C. grossi appears on the other hand isolated in the entire genus in having uniformly dark brown body (Fig. 11) with venter and all femora yellow, anterior margin of ostiolar peritreme medially curved (Fig. 5), in males dorsolateral inner processes of pygophore short, bilobed, more or less L-shaped parameres with a large irregular inner knob at the base of more or less uniformly wide blade of parameres and the theca with a less prominent and short dorsomedian thecal appendage (Figs. 17 and 18).

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